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Marine mini- and micro-shells from some coastal areas, Ao Plao, Ao Yai and Laem Tein Beach, Koh Kut, Trat province, Eastern Thailand

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Abstract. Marine minishells and microcells diversity from coastal areas, Ao Plao, Ao Yai and Laem Tein beach, Koh Kut, Trat province, Eastern Thailand have been investigated. From the 3rd to 9th of June, 2019. Specimens were randomly collected from sand sediment and debris in the sandy beach and rocky shore by handpicking. A total of 39 families and 81 species were recorded. At least 35 taxa are enlisted as a new record of the Gulf of Thailand.

1. Introduction

Marine microshells and minishells are the groups of tiny gastropod which very poor study in Thailand. There are few species recorded in Thai waters [1]. On the 3rd until 9th of June 2019, the Plant Genetic Conservation Project under the Royal Initiative of Her Royal Highness Princess Manha Chakri Sirindhorn and Royal Thai Navy did the natural resources surveyed at Koh Kut or Kut Island, Trat province, Eastern Thailand. This island is located in the Gulf of Thailand. Hundreds species of large marine molluscs species have reported from this island but the small size of molluscs are the very poor report form this area. In this paper, diversity of the minishells and microshells from Ao Plao, Ao Yai, and Laem Tein beach in Koh Kut were present, taxonomic identification is base on shell morphology.

2. Methods

Specimens were randomly collected by both handpicking and sieving sediments by 0.5 and 1.0-millimeter mesh size sieve from the 3 study sites, 1) Ao Plao, which is the mudflat and mangrove forest, 2) Ao Yai which is rocky shore and 3) Laem Tein which is rocky shore and coral reef outside (Figure 1). All sieved sediments were brought back to the Zoology Laboratory, Faculty of Science, Burapha University for laboratory work. In the laboratory, shells were sorted out from sand sediments using stereo microscope Olympus SZ30. Cleaned shells were photographed by using a Canon MPE-65 macro lens. Taxonomic identification was done by using the literature of Okutani, Robba, and Poppe [2-6] as the main documents.



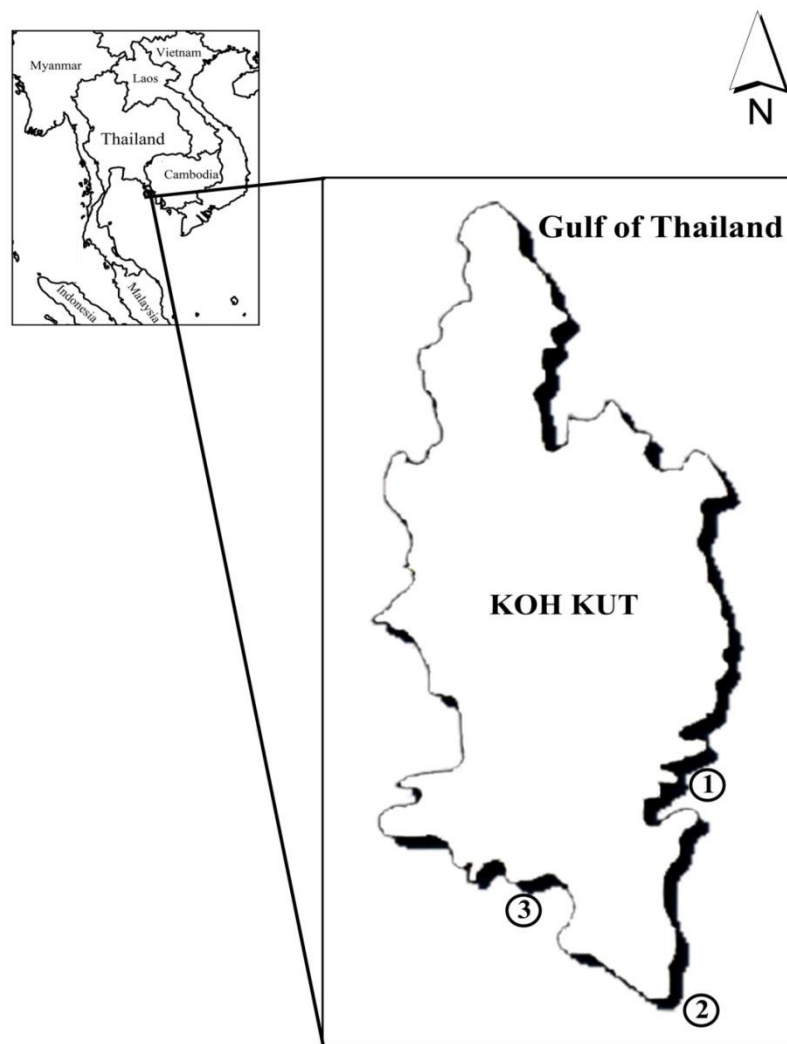


Figure 1. Study sites. 1) Ao Yai, 2) Laem Tein and 3) Ao Plao.

3. Result and discussion

From the field survey, a total of 39 families and 81 species were recorded (Figure 2-3 and Table 1). Snails in the family Cerithiidae, Triphoridae and Rissoidae are the most diverse diversity which is 8, 7 and 7 species respectively and at least 30 species are a new record to the Gulf of Thailand. From Table 1, Laem Tein is the most diverse diversity, 64 species, followed by Ao Yai and Ao Plao which are 26 and 5 species, respectively.

Table 1. Alphabetically list and distribution of mini- and micro-shells collected in this study.

No.	Family	Scientific name	AP	AY	LT
1	Acteonidae	<i>Pupa sekii</i> (Habe, 1958)		√	
2	Assimineidae	<i>Angustassiminea castanea</i> (Westerlund, 1883)			√
3	Caecidae	<i>Caecum japonicum</i> (Habe, 1978)			√
4		<i>Caecum cf. neocaledonicum</i> (de Folin, 1868)			√
5	Calliostomatidae	<i>Tristichotrochus consors</i> (Lischke, 1872)			√
6	Cerithiidae	<i>Cerithium alutaceum</i> (Gould, 1861)		√	√
7		<i>Cerithium columna</i> (G. B. Sowerby I, 1834)			√
8		<i>Cerithium coralium</i> (Kiener, 1841)			√
9		<i>Cerithium crassilabrum</i> (Krauss, 1848)			√
10		<i>Cerithium</i> sp.			√
11		<i>Cerithium</i> sp.2			√
12		<i>Cerithium zonatum</i> (W. Wood, 1828)			√
13		<i>Clypeomorus brevis</i> (Quoy & Gaimard, 1834)			√
14	Cerithiopsidae	<i>Clatropsis</i> sp.			√
15		<i>Horologica cf. fraudulenta</i> (Cecalupo & Perugia,			√
16		<i>Joculator marileutes</i> (Melvill & Standen, 1896)	√		
17		<i>Joculator</i> sp.			√
18		<i>Paraseila ampulla</i> (Laseron, 1956)		√	
19	Chilodontaidae	<i>Herpetopoma exasperatum</i> (A. Adams, 1853)			√
20	Columbellidae	<i>Euplica scripta</i> (Lamarck, 1822)		√	√
21		<i>Pyrene marmorata</i> (Gray, 1839)			√
22		<i>Zafra pumila</i> (Dunker, 1858)			√
23	Costellariidae	<i>Vexillum</i> sp.			√
24	Dialidae	<i>Diala albugio</i> (R. B. Watson, 1886)			√
25	Dialidae	<i>Diala semistriata</i> (Philippi, 1849)		√	√
26	Ellobiidae	<i>Melampus sincaporensis</i> L. Pfeiffer, 1855			√
27	Epitoniidae	<i>Epitonium crassicostatum</i> (Gittenberger &			√
28		<i>Epitonium pulchellum</i> (Bivona, 1832)			√
29		<i>Epitonium</i> sp.			√
30	Eucyclidae	<i>Putzeysia wiseri</i> (Calcara, 1842)		√	
31	Iravadiidae	<i>Iravadia cf. bombayana</i> (Stoliczka, 1868)		√	
32	Littorinidae	<i>Echinolittorina vidua</i> (Gould, 1859)			√
33		<i>Nodilittorina pyramidalis</i> (Quoy & Gaimard, 1833)			√
34		<i>Peasiella roepstorffiana</i> (Nevill, 1885)		√	√
35	Liotidae	<i>Liotium</i> sp.			√
36	Lottiidae	<i>Patelloida pygmaea</i> (Dunker, 1860)		√	
37	Mangeliidae	<i>Heterocithara himerta</i> (Melvill & Standen, 1896)			√
38	Mitridae	<i>Pseudonebularia tabanula</i> (Lamarck, 1811)			√
39		<i>Strigatella aurantia</i> (Gmelin, 1791)		√	√
40	Modulidae	<i>Modulus modiolus</i> (Linnaeus, 1758)			√

Remark: AP = Ao Plao, AY = Ao Yai and LT = Laem Tein

Table 1. Alphabetically list and distribution of mini-and microshells collected in this study (cont.).

No.	Family	Scientific name	AP	AY	LT
41	Neritidae	<i>Clithon oualaniense</i> (Lesson, 1831)	√		
42	Planaxidae	<i>Angiola zonata</i> (A. Adams, 1853)		√	
43		<i>Hinea inepta</i> (Gould, 1861)		√	√
44		<i>Supplanaxis niger</i> (Quoy & Gaimard, 1833)			√
45	Pterotracheaidae	<i>Firoloida desmarestia</i> Lesueur, 1817		√	
46	Pyramidellidae	<i>Pyrgiscilla yoritomoi</i> (Nomura, 1938)		√	
47	Raphitomidae	<i>Hemilienardia apiculata</i> (Montrouzier, 1864)			√
48	Rissoidae	<i>Alvania ogasawarana</i> (Pilsbry, 1904)		√	
49		<i>Rissoina ambigua</i> (Gould, 1849)		√	√
50		<i>Rissoina angasii</i> (Pease, 1872)			√
51		<i>Rissoina cf. costulata</i> (Dunker, 1860)			√
52		<i>Phosinella pura</i> (Gould, 1861)		√	√
53		<i>Rissoina</i> sp.			√
54		<i>Stosicia undulate</i>			√
55	Scaliolidae	<i>Finella purpureoapicata</i> (Preston, 1905)			√
56		<i>Finella rufocincta</i> (A. Adams, 1861)		√	
57		<i>Finella</i> sp.			√
58		<i>Scaliola arenosa</i> (A. Adams, 1862)	√	√	
59	Siphonaridae	<i>Siphonaria</i> sp.			√
60	Skeneidae	<i>Munditiella ammonoceras</i> (A. Adams, 1863)			√
61	Skeneopsidae	<i>Skeneopsis planorbis</i> (O. Fabricius, 1780)	√		√
62	Triphoridae	<i>Coriophora cnodax</i> (Jousseaume, 1884)			√
63		<i>Coriophora fusca</i> (Dunker, 1860)		√	√
64		<i>Coriophora</i> sp.			√
65		<i>Costatophora iniqua</i> (Jousseaume, 1898)		√	
66		<i>Iniforis cf. fusiformis</i> (Kosuge, 1961)			√
67		<i>Mastonia rubra</i> (Hinds, 1843)			√
68		<i>Mastonia</i> sp.			√
69	Trochidae	<i>Eurytrochus cognatus</i> (Pilsbry, 1903)		√	
70		<i>Clanculus margaritarius</i> (Philippi, 1846)			√
71	Truncatellidae	<i>Truncatula pfeifferi</i>			√
72	Turridae	<i>Menathais tuberosa</i> (Röding, 1798)		√	√
73		<i>Philbertia (pseudodaphnella) tineta</i>			√
74		<i>Tenguella granulata</i> (Duclos, 1832)		√	√
75	Vanikoridae	<i>Macromphalus styliferinus</i> (Nevill, 1884)			√
76	Vermetidae	<i>Dendropoma</i> sp.		√	
77		<i>Thylacodes variabilis</i> (Hadfield & Kay, 1972)			√
78		<i>Pseudoliotia asteriscus</i> (Gould, 1859)		√	√
79	Vitrinellidae	<i>Pseudoliotia reeviana</i> (Hinds, 1843)			√
80		<i>Vitrinella lenticular</i> (Gould, 1861)	√		
81	Zebinidae	<i>Zebina isolata</i> (Laseron, 1956)			√

Remark: AP = Ao Plao, AY = Ao Yai and LT = Laem Tein

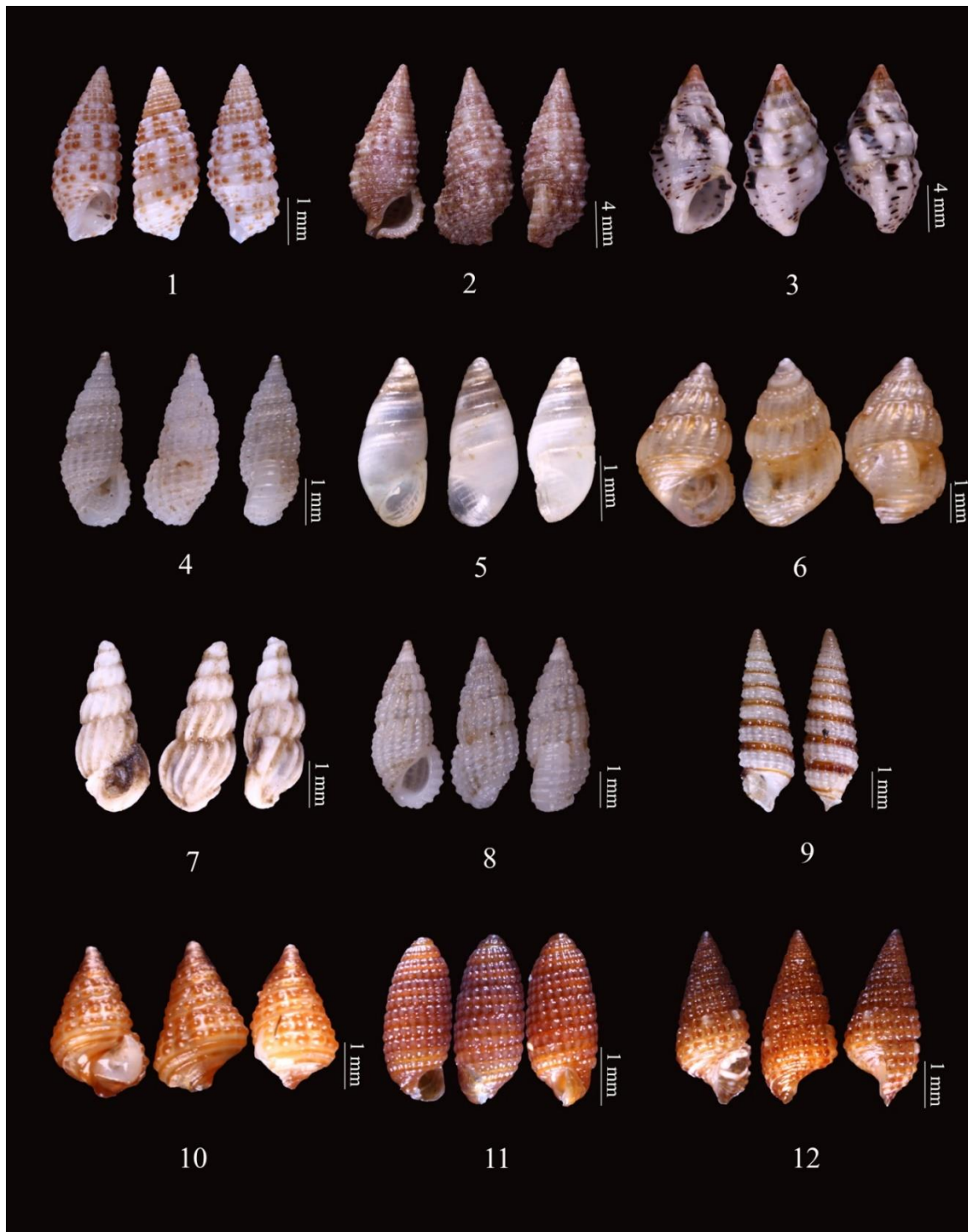


Figure 2. Some microshells recorded from this study. 1) *Cerithium alutaceum*, 2) *Cerithium crassilabrum*, 3) *Clypeomorus brevis*, 4) *Rissoina pura*, 5) *Rissoina* sp., 6) *Alvania ogasawarana*, 7) *Rissoina* cf. *costulata*, 8) *Stosicia undulate*, 9) *Costatophora iniqua*, 10) *Joculator marileutes*, 11) *Joculator* sp., 12) *Clatropsis* sp..

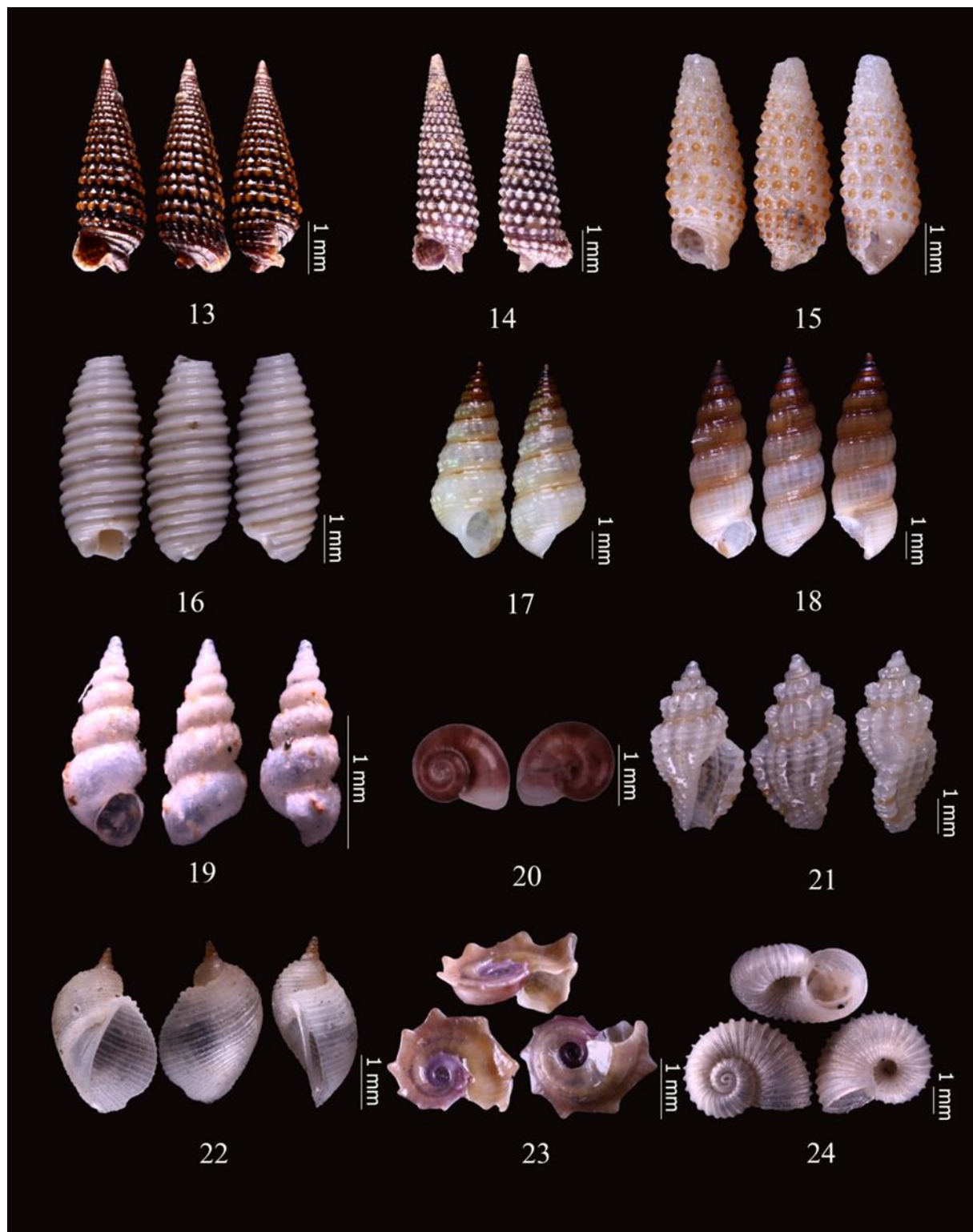


Figure 3. Some microshells recorded from this study. 13) *Coriophora fusca*, 14) *Mastonia* sp., 15) *Coriophora cnodax*, 16) *Paraseila ampulla*, 17) *Finella purpureoapicata*, 18) *Finella rufocincta*, 19) *Scaliola arenosa*, 20) *Skeneopsis planorbis*, 21) *Heterocithara himerta*, 22) *Macromphalus styliiferinus*, 23) *Liotium* sp., 24) *Munditiella ammonoceras*.

4. Conclusion

A total of 39 families, and 81 species of minishells and microshells were collected from Ao Plao, Ao Yai and Laem Tein beach, Koh Kut, Trat province, Eastern Thailand. Laem Tein is the most diverse diversity follow by Ao Yai and Ao Plao respectively.

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